(1) Critical weight;
(2) Critical center of gravity;
(3) Power for level flight at 0.9 $V_H$ or 0.9 $V_{NE,}$ whichever is less;
(4) The landing gear retracted; and
(5) The rotorcraft trimmed at 0.9 $V_H$ or 0.9 $V_{NE,}$ whichever is less.

(c) *Autorotation.* Static longitudinal stability must be shown in autorotation at airspeeds from 0.5 times the speed for minimum rate of descent to $V_{NE,}$ or to 1.1 $V_{NE}$ (power-off) if $V_{NE}$ (power-off) is established under §27.1505(c), and with—
(1) Critical weight;
(2) Critical center of gravity;
(3) Power off;
(4) The landing gear—
(i) Retracted; and
(ii) Extended; and
(5) The rotorcraft trimmed at appropriate speeds found necessary by the Administrator to demonstrate stability throughout the prescribed speed range.

(d) *Hovering.* For helicopters, the longitudinal cyclic control must operate with the sense and direction of motion prescribed in §27.173 between the maximum approved rearward speed and a forward speed of 17 knots with—
(1) Critical weight;
(2) Critical center of gravity;
(3) Power required to maintain an approximate constant height in ground effect;
(4) The landing gear extended; and
(5) The helicopter trimmed for hovering.

(Secs. 313(a), 601, 603, 604, and 605 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, 1423, 1424, and 1425); and sec. 6(c) of the Dept. of Transportation Act (49 U.S.C. 1655(c)))

[Doc. No. 5074, 29 FR 15695, Nov. 24, 1964, as amended by Amdt. 27–2, 33 FR 963, Jan. 26, 1968; Amdt. 27–11, 41 FR 55468, Dec. 20, 1976; Amdt. 27–14, 43 FR 2325, Jan. 16, 1978; Amdt. 27–21, 49 FR 44433, Nov. 6, 1984; Amdt. 27–34, 62 FR 46173, Aug. 29, 1997]

### § 27.177 Static directional stability.

Static directional stability must be positive with throttle and collective controls held constant at the trim conditions specified in §27.175 (a) and (b). This must be shown by steadily increasing directional control deflection for sideslip angles up to ±10° from trim. Sufficient cues must accompany sideslip to alert the pilot when approaching sideslip limits.

[Amdt. 27–21, 49 FR 44433, Nov. 6, 1984]

#### GROUND AND WATER HANDLING CHARACTERISTICS

### § 27.231 General.

The rotorcraft must have satisfactory ground and water handling characteristics, including freedom from uncontrollable tendencies in any condition expected in operation.

### § 27.235 Taxiing condition.

The rotorcraft must be designed to withstand the loads that would occur when the rotorcraft is taxied over the roughest ground that may reasonably be expected in normal operation.

### § 27.239 Spray characteristics.

If certification for water operation is requested, no spray characteristics during taxiing, takeoff, or landing may obscure the vision of the pilot or damage the rotors, propellers, or other parts of the rotorcraft.

### § 27.241 Ground resonance.

The rotorcraft may have no dangerous tendency to oscillate on the ground with the rotor turning.

#### MISCELLANEOUS FLIGHT REQUIREMENTS

### § 27.251 Vibration.

Each part of the rotorcraft must be free from excessive vibration under each appropriate speed and power condition.

## Subpart C—Strength Requirements

#### GENERAL

### § 27.301 Loads.

(a) Strength requirements are specified in terms of limit loads (the maximum loads to be expected in service) and ultimate loads (limit loads multiplied by prescribed factors of safety). Unless otherwise provided, prescribed loads are limit loads.

(b) Unless otherwise provided, the specified air, ground, and water loads must be placed in equilibrium with inertia forces, considering each item of mass in the rotorcraft. These loads